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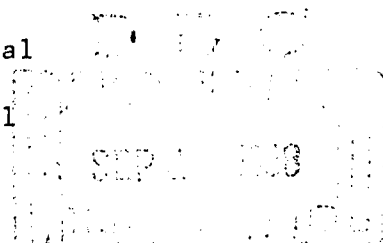
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GROWTH AND REPRODUCTION OF RICE PLANTS IN NORTH VIETNAM

[Following is a translation of an article by Bui Huy Dap in the Vietnamese-language periodical Khoa Hoc Ky Thuat Nong Nghiep (Agricultural Sciences & Technology), Hanoi, 1964?, pp 64-66.]

The tropical climate of Vietnam permits the plantation of several rice crops each year. The two main crops are: the "chiem" crop with seeding in October and November, and harvest in May and June; the "mua" crop with seeding in May and June, and harvest in October and November.

Since the establishment of the people's government, the processes of agrarian reform and agricultural cooperativization have brought about two additional crops which in the past had not been planted too widely: the spring crop with seeding in February and March, and harvest in June; the summer crop with seeding in April and May, and harvest in July and August.

In his study of rice growing techniques, the author has focused his attention on the growth and reproduction of rice plants under climatic conditions indigenous to Vietnam.

A. Concerning the growth of rice plants the author has made the following observations:

1. Tropical climate accelerates the growth of vegetables. For rice the effects of climate are very clearly manifested. The most essential biological characteristic: The "chiem" rice is planted under conditions of dry and cold air. Hence, the main stalk and secondary stalks that appear early, often give shorter spikes than secondary stalks that

appear later in spring. For summer-planted rice, however, secondary stalks give spikes almost as long as those from main stalks. The relative sizes of main spikes and secondary spikes also depend on planting density. Under climatic conditions indigenous to Vietnam, restrictions should not be imposed upon the growth of rice plants. A large number of secondary stalks spreading uniformly indicate healthy clumps of rice plants. Therefore, this important biological characteristic must be accorded special attention in order to obtain high yields.

2. In practice, the density effect concerns not only individual clumps but all clumps in a rice field since the clumps interact with each other. The smaller the clumps and the greater the spacing between them, the more vigorous the growth. The bigger the clumps and the smaller the spacing between them, the weaker the growth. If planting density is excessive, some clumps and some stalks will rot away. The number of stalks planted in a unit-area of land can vary by 4,800 per cent. In contrast, the number of grains produced per unit area varied within a much narrower range (approximately 30 per cent). Planting density, i.e., the number of clumps and stalks per unit area, bears a very strong influence on the rate and capacity of growth, on the number of spikes and the number of grains per spike. For a given planting density, the variations in grain yield is less significant. Although various groups of clumps in a rice field differ widely from each other in the beginning, they end up producing quantities of grains per unit area which are not proportional to the planting density of each group. Thus growth has a regulating effect on the growth of rice plants in the rice field as a whole. This regulating effect is very important and must be carefully considered in practical application.

Since each clump is usually made up of a number of stalks, it is a small group in the entire rice field. Due to complex relations between stalks, clumps and groups of clumps in the rice field, the development of the rice field as a whole is determined by the distribution and the number of clumps per unit area for a given number of stalks, or by the number of stalks per clump for a given number of clumps. Under conditions prevailing in our country, the number of stalks per clump must, in general, be small: For a fixed number of clumps, the number of stalks per unit area must be decreased; for a fixed number of stalks, the number of clumps per unit area must be increased.

4. In brief, the author's investigation has led to the conclusion that under climatic conditions indigenous to Vietnam the techniques of rice growing should not be based solely on the main spikes. This conclusion has been tested in thousands of rice fields belonging to agricultural cooperatives, and it agrees with the age-old experience of our peasants. Practical rules applicable thereto are as follows:

- The seeding density must be between 1,000 and 2,000 grains/m², depending on the kind of rice and the season.

- The number of stalks per clump must be three to four, for summer rice and main crop rice, five to seven for "chiem" rice and spring rice. For these two kinds of rice, the number must be increased by two to three for deep fields, low-quality fields or late planting, and it should be one to two in fields with good soil, well prepared or for early planting.

- The density of clumps must be moderate: 25-30 clumps/m², under average conditions; 50 clumps/m², in poor soil; 15-20 clumps/m², in good soil.

- Weeding and fertilizing must be early in order to effectively stimulate growth: 20-25 days after planting for "chiem" rice; eight to 12 days after planting for spring rice, summer rice and main crop rice.

B. With regard to reproduction the author's findings are as follows:

1. Generally, seeds for main crop rice and summer-autumn rice do not have definite response to germination stimulus. The "chiem" rice germinates in five to ten days at 20°-37°C in winter, and sprouts come forth in seven to nine days. The main crop rice, seeded in winter, responds to definite germination stimulus. However, the earlier the "chiem" rice is seeded, the less definite is its response to the stimulus. It is probable that the natural conditions in Vietnam are, in general, favorable for the germination process.

2. The photosynthesis period in North Vietnam is as follows:

- For short-term rice (Nam Ninh rice) this period starts 15 days after seeding and lasts for 35-40 days.

- For main crop rice (Tam Den rice) it starts 20 days after seeding and lasts for about 65 days.

- For "chiem" rice (Chiem Chanh rice), this period usually starts 90-100 days after seeding and lasts for 35-40 days.

3. In Vietnam, temperature has a definite effect on both growth and reproduction of rice plants. For "chiem" rice, summer rice, and early main crop rice, temperature is more important than the length of the day. High temperature can counteract the inhibitive effect of a long day; similarly, low temperature can cancel the stimulating effect of a short day. Even with regular main crop rice and late main crop rice which are sensitive to light, the effect of temperature is important. Therefore, this factor must be taken into consideration in arranging the rice crops in the agricultural calendar and importing rice varieties from the northern regions of the country.

4. In view of this characteristic, rice varieties in Vietnam can be classified into two categories according to time of blossom:

- The first category comprises rice varieties which can blossom any time during a considerable portion of the year, hence can be seeded in several seasons (spring rice, summer rice, early main crop rice, "chiem" rice).

- The second category includes rice varieties which can blossom at a definite time of the year (regular main crop rice and late main crop rice).

5. According to sensitivity to duration of day, rice varieties can be divided into four categories:

- Those with very low sensitivity to duration of day-time (short-term varieties of spring crop and summer crop can blossom in continuous light).

- Those with low sensitivity to duration of daytime (early main crop rice can also blossom in continuous light, although the blossoms are definitely late).

- Those with moderate sensitivity to duration of day-time ("chiem" rice can be seeded at several times of the year but cannot blossom in continuous light).

- Those with high sensitivity to duration of daytime (main crop rice and late main crop rice) cannot blossom in continuous light, but blossom only at a definite time of the year.

6. The data on reproduction of rice varieties in North Vietnam help distinguish the biologic groups and formalize the people's experience. This is important for determining the seeding and planting seasons for each crop, for utilizing the soil more effectively and introducing greater balance into agricultural production.

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